

REMARKS

Claims 1-25 are now pending in the present application. Applicants greatly appreciate the thorough review of the present application and the allowance of claims 12-16. Claims 19-25 have been added to recite additional embodiments of the present invention. Support for claims 19-25 is found throughout the present application and in particular on page 11, lines 8-11 of the present specification. Accordingly, reconsideration and allowance of the claims in the present application as amended are earnestly solicited in view of the following remarks.

Claims 1-6, 8-11 and 18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,458,754 to Sathrum et al. in view of U.S. Patent No. 3,881,126 to Boots et al. This rejection is respectfully traversed.

Claim 1 of the present application recites a cathode sub-assembly comprising an indirectly heated cathode and a support rod fixedly attached thereto. Claim 9 recites a cathode assembly for use in an indirectly heated cathode ion source comprising a cathode sub-assembly, a filament and a cathode insulator. Claim 18 recites a cathode assembly for an ion source comprising a cathode, a support rod, a cathode insulator and an indirect heating source. The indirectly heated cathode is electrically and thermally isolated from its surroundings to promote emission of electrons from the ion source. Specifically, power to the cathode is increased by minimizing heat loss in the claimed assembly of the present application.

Sathrum et al. is relied upon to disclose a plasma guide for physical vapor deposition. A source of coating material 15 represents the origin of plasma for the vapor deposition coating process and a cathode mounting apparatus 16 as illustrated in Fig. 1. The apparatus of Sathrum et al. operates without emitting electrons from the cathode. As acknowledged in this Office Action, Sathrum et al. directly heats the cathode and fails to disclose indirectly heating the cathode as recited in the claims of the present application. Therefore, Boots et al. is relied upon in attempting to cure this deficiency. Boots et al. disclose a fast warm up cathode comprising a coiled heater 17 wrapped about an elongated core 12 to provide heating thereof. The assembly of Boots et al. emits electrons from the cathode. Therefore, the operation of the Boots et al. and Sathrum et al. assemblies are fundamentally different and it therefore would not have been obvious to combine these two documents. Furthermore, even if it were possible

to combine Boots et al. and Sathrum et al., Boots et al. fail to cure the deficiencies of Sathrum et al., and it is therefore respectfully submitted that claims 1-6, 8-11 and 18 of the present application patentably define over the combination of Sathrum et al. and Boots et al.

Claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Sathrum et al. in view of Boots et al. and in further view of U.S. Patent No. 3,917,968 to DiBenedetto et al. This rejection is respectfully traversed.

Dependent claim 7 recites that the cathode sub-assembly further comprises a spring loaded clamp for holding the support rod. DiBenedetto et al. is relied upon to disclose that a thermionic filament for generating the electrons are mounted by means of resilient support means in the form of spring member. In addition to the reasons set forth in the rejection to its base claim, DiBenedetto et al. do not disclose a spring loaded clamp for holding the support rod of the indirectly heated cathode as recited in claim 7 of the present application.

Accordingly, it is respectfully submitted that claim 7 patentably defines over the combination of Sathrum et al., Boots et al. and DiBenedetto et al.

Claim 17 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Sathrum et al. in view of U.S. Patent No. 3,983,443 to Schade. This rejection is respectfully traversed.

Claim 17 of the present application recites a method for supporting and indirectly heating a cathode of an ion source comprising the steps of supporting the indirectly heated cathode and bombarding the cathode with electrons. The indirectly heated cathode is electrically and thermally isolated from its surroundings to promote emission of electrons. As acknowledged in this Office Action, Sathrum et al. fails to disclose a method for indirectly heating the cathode as recited in the claims of the present application. Therefore, Schade is relied upon in attempting to cure this deficiency. Schade discloses a heater cathode assembly for a vacuum electron device that may be used in television picture tubes. However, Schade does not disclose an indirectly heated cathode ion source that is electrically and thermally isolated from its surrounding to promote emission of electrons. Because Schade fails to cure the deficiencies of Sathrum et al., it is respectfully submitted that claim 17 of the present application patentably defines over the combination of Sathrum et al. and Schade.

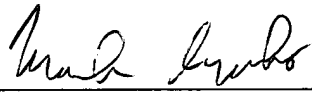
In view of these amendments and for all of the above stated reasons, it is respectfully submitted that all of the outstanding objections and rejections have been overcome. Therefore, it is requested that claims 1-25 of the present application be passed to issue.

In the event that all of the claims are not placed in condition for allowance, it is respectfully requested that these amendments be entered for the purpose of appeal.

If any issues remain unresolved, the Examiner is requested to telephone the undersigned attorney.

Please charge any additional fees or credit any overpayments to deposit account No. 50-0896.

Respectfully submitted,
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Docket No. VSEA 009-00